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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/993,783	11/14/2001	Steven Gray	9D-HR-19209	8847

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EXAMINER	
RO, BENTSU	

ART UNIT	PAPER NUMBER
2837	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/993,783	Applicant(s) GRAY ET AL.	
	Examiner Bentsu Ro	Art Unit 2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-52 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 10-16 is/are allowed.

6)☒ Claim(s) 1,2,7,8,17-19,21,22,24,25,27,28,30-32,34,35,37,38,40-42,44,45,47,48,50 and 51 is/are rejected.

7)☒ Claim(s) 3-6,9,20,23,26,29,33,36,39,43,46,49 and 52 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

FIRST OFFICE ACTION

1. Drawing corrections are required as follows:
In Fig. 4, label box 32 as a "processor" and box 34 as a "PWM circuit".

2. This application contains 53 claims but there is no claim 18. According to 37 CAR 1.126, claims must be numbered consecutively. Therefore, the mis-numbered claims 19-53 have been re-numbered as claims 18-52, respectively. The pending claims are 1-52.

Any mis-numbered claim increases the communication difficulty. In order to avoid further mis-communication, applicant must make these changes. The new claim numbers will be used throughout the prosecution of the application.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.
> The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1, 2, 17, 18, 19, 27, 28, 30, 31, 32 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by **Van Landingham US Patent No. 4,300,081.**

Claims read onto Van Landingham patent as follows:

The claims: **Van Landingham teaching:**

1. A method for controlling speed in a pulse-width-modulation controlled motor powered by a load voltage source, said method comprising the steps of:	Van Landingham Fig. 1 teaches a method and an apparatus for controlling a motor speed with a pulse width modulation (PWM); column 1, line 15 states "In a pulse-width-modulated system"; Fig. 2 shows the waveforms of PWM; Fig. 1 shows a storage battery 24, which is a load voltage source;
measuring the motor load voltage; and	Fig. 1 shows a servo motor voltage averaging circuit 58, this circuit measures the motor load voltage at motor terminals 34 and 35;
setting a pulse-width-modulation duty cycle based on the measured voltage.	the output of the averaging circuit 58 summed with the output of a signal generator 64 at a terminal 62 to set a PWM duty cycle.
2. A method in accordance with claim 1 wherein said steps are sequentially executed and repeated automatically while the motor is in an on state.	All circuits are sequentially executed because the output must always respond to the input; the circuit operations are also repeated automatically because each input change immediately causes the output to change; further, this is a servo system, the servo system requires the output response to any change in the input immediately.
17. A method for operating a motor configured to operate at a variable average speed under pulse-width modulation control, said method comprising the steps of:	same as claim 1; further, all PWM control is a variable speed motor control;
energizing the motor; and	the turn on of the switches 16, 18 or 20, 22 will energize the motor;

setting an average speed by superimposing a sweep frequency on an average pulse-width modulation frequency.	the sweeping frequency reads onto the frequency output from the signal generator 64; the average pulse-width modulation frequency reads onto the average output voltage of the circuit 58 (i.e. the frequency in terms of a voltage); it is noted that the dc servo motor 10 has a counter EMF, which counter EMF is related to the PWM frequency, therefore, the average PWM frequency reads onto the average servo motor terminal voltage measured by the averaging circuit 58 (frequency in terms of a voltage).
18. (And claim 19.) A method in accordance with claim 17 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average PWM frequency forming a monotonically increasing (decreasing) waveform.	The error signal at conductor 50 sets forth a monotonically increasing (or decreasing) PWM waveform because (1) the error signal is connected to the terminal 62 along with the signal generator 64 and the averaging circuit 58, the error signal provides a dc offset voltage; (2) the dc offset error signal gradually decreases in the servo control by the movement of the motor shaft on a feedback potentiometer 40, and (3), once the feedback signal from the potentiometer 40 changes, the error signal decreases, the PWM will change monotonically by decreasing ON period or increasing OFF period, which results in "a monotonically increasing (decreasing) waveform" as claimed.
27. A motor comprising:	Same as claim 1; albeit not clearly shown, the elements "a housing", "a stator" and "a rotor" are all in the dc servomotor 10.

28. A motor in accordance with claim 27 wherein said processor further configured to diagnose motor functionality.	The motor speed or motor voltage measured at the motor terminals 34, 35, represents the functionality of the motor; the averaging circuit 58 measures the motor terminal voltage, thus, the averaging circuit 58 is configured to diagnose the motor functionality; the output of the averaging circuit 58 represents the result of the diagnosis.
30. A motor comprising:	Same as claim 17; albeit not clearly shown, the elements "a housing", "a stator" and "a rotor" are all in the dc servomotor 10.
31 and 32.	Same as claims 18 and 19.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 21, 22, 24, 25, 34, 35, 37, 38, 40-42, 44, 45, 47, 48, 50, 51 are all rejected under 35 U.S.C. 103(a) as being unpatentable over Van Landingham.

Claims 40-42 claim the same subject matter as that of claims 17-19 except claims 40-42 further include the limitation of a refrigerator having a housing, a freezer, a fresh food section.

Claims 50 and 51 set forth the same subject matter as that of claims 1 and 28, respectively except claims 50, 51 further include the limitation of a refrigerator having a housing, a freezer, a fresh food section.

With respect to these claims, Van Landingham does not teach his motor and control to be used with a in refrigerator, however, the limitation of refrigerator is merely an obvious intended use. It is well known in the art that a refrigerator requires at least one motor fan for temperature control. In view of this well known art, it would have been obvious to a skilled person in the art to use Van Landingham's motor to control a fan in a refrigerator.

Regarding claims 21, 22, 24, 25, 34, 35, 37, 38, 44, 45, 47, 48, the setting of the percent range of the high value motor speed and the low value motor speed is an obvious design choice. These speed ranges can be set by setting the positive and negative reference voltages $+V_R$ and $-V_R$ at the input terminals to the comparators 74, 75.

7. **Examiner's comments to the claims:** Claims 1-52 are restrictable. Claims 1-52 can be restricted into two groups. The first group includes claims 1-39. These claims are claiming a PWM motor control. The second group includes claims 40-52. These claims are claiming a refrigerator using the motor control of claims 1-39. Thus, claims 1-52 constitute a combination and a sub-combination, and therefore, restrictable.

For the time being, the examiner has examined all claims. In response to the rejection, if applicant argues the patentability based on the refrigerator system, then the examiner will impose a restriction requirement to exclude claims 40-52 from this prosecution. In that case, applicant may file a separate application claiming the refrigerator system so that the examiner can concentrate his search on the refrigerator system.

8. Claims 1, 2, 17, 18, 19, 27, 28, 30, 31, 32 are all rejected under 35 U.S.C. 102(b) as being clearly anticipated by **Sakoh US Patent No. 5,268,987.**

Sakoh Fig. 9 (prior art) shows a voltage V1 which is a "motor load voltage"; a dc power source A which is a "load voltage source"; a voltage V4 which is an "average PWM frequency" (a frequency in terms of a voltage); a voltage V5 which is a "sweep frequency". The reasons of the rejection are basically the same as that of paragraph 2 above, no further discussion is needed.

9. Claims 21, 22, 24, 25, 34, 35, 37, 38, 40-42, 44, 45, 47, 48, 50, 51 are all rejected under 35 U.S.C. 103(a) as being unpatentable over Sakoh.

The reasons of rejection is same as that of paragraph 6 above, no further discussion is needed.

10. Claims 27 and 28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Mourad et al US Patent 6,236,175 B1.**

Regarding to these claims, the load voltage reads onto the back emf or V_0 and the functionality reads onto the motor speed.

11. Claims 1, 2, 27, 28 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by **Kubozuka et al US Patent No. 6,509,709 B2.**

The motor load voltage is measured at terminal "a" (see the sole figure), and the motor speed is controlled by PWM at block 3.

12. Claim 7 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by **Lambropoulos et al US Patent No. 4,611,154.**

Claim 7 reads onto Lambropoulos et al teaching as follows:

Claim 7:	**Lambropoulos et al teaching:**
A method for controlling speed in a pulse-width-modulation-controlled motor	Fig. 4 shows a motor circuit 14, the motor circuit 14 is a PWM motor;
powered by a load voltage,	the load voltage reads on the voltage between the harness 20 (or terminal 20) and the ground potential;
the load voltage supplied by a supply voltage,	the supply voltage reads onto the voltage between the battery connection 12 and the ground potential; the battery voltage supplies the load voltage as clearly shown in Fig. 4;
said method comprising the steps of:	
diagnosing motor functionality using the difference between the supply voltage and the load voltage; and	Fig. 4 further shows a current loop 152, the loop 152 diagnoses the motor functionality by using the voltage difference between the terminal 20 and the terminal 12;
switching from motor functionality diagnosis to motor speed control.	Fig. 10 shows a step "3 SECOND FAN TEST", which is a functionality test; following the "3 SECOND FAN TEST" step, there is an another step "FAN ON/WARNING OFF", which "FAN ON/WARNING OFF" step is a step of switching from motor functionality diagnosis to motor speed control.

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lambropoulos et al.

Regarding claim 8, Lambropoulos teaches a functionality test using reduced power, however, a full power can also be used even though it is not taught by Lambropoulos.

14. Claims 10-16 are allowable.

15. Claims 3-6, 9, 20, 23, 26, 29, 33, 36, 39, 43, 46, 49, 52 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

17. Any inquiry concerning this communication should be directed to Bentsu Ro at telephone number 703 308-3656.

February 19, 2003

Bentsu Ro
Primary Examiner